



US005739791A

United States Patent [19]**Barefield et al.**[11] **Patent Number:** **5,739,791**[45] **Date of Patent:** **Apr. 14, 1998**[54] **ANTENNA FOR USE WITH A RADIO
INSTALLED IN AN EXPANSION SLOT OF A
COMPUTER SYSTEM**[75] **Inventors:** **Jonathan D. Barefield**, Alpharetta;
Hosea D. Dorris, Norcross; **Emory P.
Long**, Lawrenceville, all of Ga.[73] **Assignee:** **LXE Inc.**, Norcross, Ga.[21] **Appl. No.:** **554,085**[22] **Filed:** **Nov. 6, 1995**[51] **Int. Cl.⁶** **H01Q 1/24**[52] **U.S. Cl.** **343/702; 343/795**[58] **Field of Search** 343/702, 700 MS,
343/795, 872; 455/89, 90; H01Q 1/24[56] **References Cited****U.S. PATENT DOCUMENTS**

5,043,721	8/1991	May	340/825.44
5,293,400	3/1994	Monod et al.	.....	375/7
5,307,297	4/1994	Iguchi et al.	.....	364/708.1
5,335,276	8/1994	Thompson et al.	.....	380/21
5,345,231	9/1994	Koo et al.	.....	340/870.31
5,361,061	11/1994	Mays et al.	.....	343/702
5,404,583	4/1995	Lalezari et al.	.....	455/90
5,418,524	5/1995	Fennell	.....	340/825.22
5,436,621	7/1995	Macko et al.	.....	340/825.44
5,437,057	7/1995	Richley et al.	.....	455/41
5,495,260	2/1996	Couture	.....	343/702
5,557,288	9/1996	Kato et al.	.....	343/702

FOREIGN PATENT DOCUMENTS

24722 10/1994 WIPO H01Q 1/24

Primary Examiner—Hoanganh T. Le
Attorney, Agent, or Firm—Jones & Askew, LLP[57] **ABSTRACT**

An antenna that may be retrofitted for incorporation in an internal compartment of a computer terminal when a radio transmitter or receiver is installed in an expansion slot of the computer terminal. The present invention provides a radio receiver/transmitter communication system for a computer terminal. The computer terminal includes an expansion slot operative to receive a radio transmitter or receiver and includes an enclosed compartment defined in the housing of the computer terminal. The enclosed compartment is separate from the expansion slot. The radio receiver/transmitter communication system includes a printed circuit board and a radio frequency communication medium. The radio frequency communication medium is etched on a first side of the printed circuit board, thereby forming a circuit board antenna, and the printed circuit board antenna is positioned within the enclosed compartment of the computer terminal. The radio communication system also includes a radio transmitter/receiver expansion board installed in the expansion slot and a connection cable connected to and providing a transmission path between the radio frequency communication medium of the circuit board antenna and the radio transmitter/receiver. The radio communication system is preferably implemented in a portable computer terminal that includes a the stylus pen slot as an internal compartment.

18 Claims, 4 Drawing Sheets